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(PTO ASSISTANCE)

Application :	<u>09/460913</u>	Examiner :	<u>Azad</u>	GAU :	<u>2654</u>
From :	<u>NIB</u>	Location :	<u>IDC</u> FMF FDC	Date :	<u>12-6-05</u>
Tracking #:			<u>epm 09460913</u>		
			Week Date: <u>11-14-05</u>		

DOC CODE	DOC DATE	MISCELLANEOUS
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<input type="checkbox"/> IDS	_____	<input type="checkbox"/> Foreign Priority
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<input type="checkbox"/> IIFW	_____	<input type="checkbox"/> Fees
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<input type="checkbox"/> OATH	_____	
<input type="checkbox"/> 312	_____	
<input checked="" type="checkbox"/> SPEC	<u>12-14-1999</u>	

[RUSH] MESSAGE: Specification have docket nos. only, missing serial number.

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Thank You
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[XRUSH] RESPONSE: _____

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**METHODS AND APPARATUS FOR CONTINGENT TRANSFER AND
EXECUTION OF SPOKEN LANGUAGE INTERFACES**

Cross Reference To Related Applications

Spoken Language User

Interface Manager

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The present invention is related to U.S. patent applications entitled "~~A Scalable~~
~~Low Resource Dialog Manager~~" (attorney docket no. Y0998-520), "~~Personal Speech~~
~~Supporting a Dialog Manager~~" (attorney docket no. Y0998-521), and "Methods and Apparatus for
Synchronizing Voice and Text Data in Accordance with Computing Devices" (attorney
docket no. Y0998-523), all filed concurrently herewith and the disclosures of which are
incorporated herein by reference.

10 **Field of the Invention**

The present invention generally relates to spoken language interfaces employed in association with computing apparatus and, more particularly, to methods and apparatus for contingent transfer and execution of such spoken language interfaces.

15 **Background of the Invention**

Spoken language interfaces are most commonly encountered in telephony interfaces. These interfaces are executed on computing systems which are dedicated to a single application such as gathering user data for order taking. In order to accomplish this, the user is prompted to utter the required data. Limited command decoding is occasionally provided in the form of questions which can be answered with a "yes" or a "no" or a string of numbers. Such an interface is provided for a single application and has no requirement for dynamic change in the content of the commands or prompts since the dedicated task of the application is unchanging. Further, spoken language services are obtained to build the interface by linking an API or application programmers interface.

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25 An interface which engages in a dialog with the user, be it free form or carefully structured and directed, may be created entirely within an executing application or it may

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be created for the application by a "dialog manager." In general, it is desirable that such a dialog manager support the initiative of either the user or the application. It is, thus, like a communications pipe between the user and the application. Such a dialog manager is described in the above-referenced and concurrently filed U.S. patent application identified by ~~attorney docket no. YO998-521~~ ⁰⁹⁴⁶⁰⁰⁷⁷ *Supporting A Dialog Manager*, in the name of L. Comerford et al., and entitled: "X Personal Speech Assistant." It is important to distinguish dialog management, as in the above-referenced patent application, from provision of application programmer interfaces for the "engines" (such as a spoken command decoding engine) providing language related services. APIs, such as Microsoft's Speech Application Programmer's Interface and the JAVA consortium JSAPI interfaces, only provide an abstraction of the engines' interfaces in order to allow application programs to operate regardless of the identity of the provider of the particular engines installed on a given user's system. This provides a common low-level interface for accessing the services of engines, but leaves the creation and management of dialog to the individual applications accessing these low level interfaces. It is a pipe between the application and the engine services, not between the user and the application.

Also, given the fact that applications and engines can be dynamic in nature, the conventional APIs provide insufficient means, or no even no means, for updating themselves based on changes in an application or engine. Thus, a need exists for spoken language interface methods and apparatus which address these shortcomings in the existing art.

Summary of the Invention

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The present invention provides methods and apparatus for contingent transfer and execution of spoken language interfaces. In one embodiment, the present invention provides such methodology in the context of a device comprising a Personal Speech Assistant (PSA), ^{*Supporting A Dialog Manager*} in accordance with the above-referenced U.S. patent application identified by ~~attorney docket no. YO998-521~~ ⁰⁹⁴⁶⁰⁰⁷⁷, and a Personal Digital Assistant (PDA)

and application data 1340 (including vocabulary files 1341 and prompt files 1342). The PDA 1400 is coupled to the dialog manager 1000 of the PSA via its own serial port communications interface 1410. The PDA also comprises an application speech interface library 1420, personal information management applications 1430 and PDA operating system 1440.

While other implementations and variations of a dialog manager and user interface tables may be employed in the PSA, a preferred implementation is described following the detailed description of the PSA in a section entitled: "A Preferred Dialog Management System." It is to be appreciated that such a preferred implementation is also described in detail in the above-incorporated concurrently filed U.S. patent application identified by ~~attorney docket no. YO998-520~~ ^{Serial number 09460961} in the name of L. Comerford et al., and entitled: ^{Spoken Language User Interface Manager} ~~"A Scalable Low Resource Dialog Manager."~~

As shown in FIG. 2, the hardware implementation of this PSA 2000 embodiment comprises a system bus 2010 which couples a central processing unit (CPU) 2020, a system memory 2030, a microphone CODEC 2040, a speaker CODEC 2050 and a button interface 4150. The PSA 2000 also comprises a serial port 2060 which couples the PSA to the serial port 2100 of the PDA 2090, a microphone 2070, a speaker 2080 and microphone, volume and reset buttons 4160. It is to be appreciated that the various components of the dialog manager 1000, the spoken language engines 1200 and the user interface tables 1300 are executed in accordance with the CPU 2020 and system memory 2030. The drivers of the hardware engines are also operated in accordance with the CPU 2020 and system memory 2030, with the hardware components being implemented by the corresponding elements shown in FIG. 2.

More advanced and flexible PSAs capable of providing richer interfaces may include multi-ported communications means, nonvolatile memory for recording purposes, additional spoken language engines and other service engines such as encryptors and decoders in hardware or software form as required for the particular instantiation of the

by 3Com Corporation, the MessagePad manufactured by Apple Computer, Inc., and the OmniGo manufactured by Hewlett-Packard Company. Thus, as shown in FIG. 6, a PDA 5500 comprises a screen 5510, a handwriting area 5520, a power button 5530, scrolling buttons 5540 and shortcut buttons 5550.

5 Given the above-described component content of a rich implementation of a PSA, a detailed description of its operation in accordance with a conventional PDA will now be explained.

10 Assume that a user has placed a battery in the battery mounting space of the spoken language interface hardware 5000, and placed a conventional PDA 5500, such as a PalmPilot in the PDA mounting space so that the serial connector on the PDA is mated with the serial port connector 5020 in the PDA mounting space. The PDA in this example has been supplied with personal information management applications 3430. These applications 3430 are designed to accept voice commands by creating alias names for the graphical user interface names in the standard, non-voice applications. Voice events are supplied to the application event loop by the application speech interface 3420 which in turn receives notification of the user's spoken commands from the serial port communications interface 3410. That interface, in turn, is connected to the user's command utterances through a chain of physical hardware (FIG. 4) and logical processes described below.

15 Let us trace the creation and issue of a voice event to the communications interface to application software of the dialog manager 3000 contained in the PSA hardware 4000.

20 As described in the above-incorporated concurrently filed U.S. patent application identified by ^{serial number 09460961} attorney docket no. YO998-520, in the name of L. Comerford et al., and ^{Spoken Language User Interface Manager} entitled: "A Scalable Low Resource Dialog Manager" and as is also described below in the section entitled "A Preferred Dialog Management System," each application which can be addressed by the PSA has a vocabulary file 3341 which contains a table comprising three lists. Corresponding elements on the lists comprise a word or phrase